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SEQUENCE LISTING

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<120> mRNA Interferases and Methods of Use Thereof

<130> University of Medicine & Dentistry of New Jersey (601-1-131PCT)

<140> PCT/US2004/018571

<141> 2004-06-14

<150> 60/543,693

<151> 2004-02-11

<150> 60/478,515

<151> 2003-06-13

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aacaaaacag gtatgtgtct gtgtgttcct tgtacaacgc aatcaaaagg atatccgttc 180
gaagttgttt tatccggtca ggaacgtgat ggcgtagcgt tagctgatca ggtaaaaaagt 240
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<210> 2

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<212> PRT

<213> E. coli

<400> 2

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Phe Asp Pro Thr Lys Gly Ser Glu Gln Ala Gly His Arg Pro Ala Val
      20           25           30
Val Leu Ser Pro Phe Met Tyr Asn Asn Lys Thr Gly Met Cys Leu Cys
      35           40           45
Val Pro Cys Thr Thr Gln Ser Lys Gly Tyr Pro Phe Glu Val Val Leu
      50           55           60
Ser Gly Gln Glu Arg Asp Gly Val Ala Leu Ala Asp Gln Val Lys Ser
      65           70           75           80
Ile Ala Trp Arg Ala Arg Gly Ala Thr Lys Lys Gly Thr Val Ala Pro
      85           90           95
Glu Glu Leu Gln Leu Ile Lys Ala Lys Ile Asn Val Leu Ile Gly
      100          105          110
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<210> 3
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ggaacgcggc cgggtgctgat tgtcacaccg gcggccttta atcgcgtagac ccgcctgcct 120
gttgttgtgc ccgtaaccag cggaggcaat tttgcccgca ctgccggctt tgcggtgtcg 180
ttggatgggtg ttggcatacg taccacaggt gttgtacgtt gcgatcaacc ccggacaatt 240
gatatgaaag cacggggcgg aaaacgactc gaacgggttc cggagactat catgaacgaa 300
gttcttggcc gcctgtccac tattctgact tga 333

<210> 4
<211> 110
<212> PRT
<213> E. coli

<400> 4
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His Glu Gln Gln Gly Thr Arg Pro Val Leu Ile Val Thr Pro Ala Ala
20 25 30
Phe Asn Arg Val Thr Arg Leu Pro Val Val Val Pro Val Thr Ser Gly
35 40 45
Gly Asn Phe Ala Arg Thr Ala Gly Phe Ala Val Ser Leu Asp Gly Val
50 55 60
Gly Ile Arg Thr Thr Gly Val Val Arg Cys Asp Gln Pro Arg Thr Ile
65 70 75 80
Asp Met Lys Ala Arg Gly Gly Lys Arg Leu Glu Arg Val Pro Glu Thr
85 90 95
Ile Met Asn Glu Val Leu Gly Arg Leu Ser Thr Ile Leu Thr
100 105 110

<210> 5
<211> 249
<212> DNA
<213> E. coli

<400> 5
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ttaatgcagg cgctcaatct gaattattgat gatgaagtga agattgacct ggtggatggc 120
aaattaatta ttgagccagt gcgtaaagag cccgtattta cgcttgctga actgggtcaac 180
gacatcacgc cggaaaacct ccacgagaat atcgactggg gagagccgaa agataaggaa 240
gtctggtaa 249

<210> 6
<211> 82
<212> PRT
<213> E. coli

<400> 6
Met Ile His Ser Ser Val Lys Arg Trp Gly Asn Ser Pro Ala Val Arg
1 5 10 15
Ile Pro Ala Thr Leu Met Gln Ala Leu Asn Leu Asn Ile Asp Asp Glu
20 25 30
Val Lys Ile Asp Leu Val Asp Gly Lys Leu Ile Ile Glu Pro Val Arg
35 40 45
Lys Glu Pro Val Phe Thr Leu Ala Glu Leu Val Asn Asp Ile Thr Pro
50 55 60
Glu Asn Leu His Glu Asn Ile Asp Trp Gly Glu Pro Lys Asp Lys Glu
65 70 75 80
Val Trp

<210> 7
<211> 258
<212> DNA
<213> E. coli

<400> 7
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ctgctgaatg cgctgtctct gggcacagat aatgaagttg gcatgggtcat tgataatggc 120
cggctgattg ttgagccgta cagacgcccg caatattcac tggctgagct actggcacag 180
tgtgatccga atgctgaaat atcagctgaa gaacgagaat ggctggatgc accggcgact 240
ggtcaggagg aaatctga 258

<210> 8
<211> 85
<212> PRT
<213> E. coli

<400> 8
Met His Thr Thr Arg Leu Lys Arg Val Gly Gly Ser Val Met Leu Thr
1 5 10 15
Val Pro Pro Ala Leu Leu Asn Ala Leu Ser Leu Gly Thr Asp Asn Glu
20 25 30
Val Gly Met Val Ile Asp Asn Gly Arg Leu Ile Val Glu Pro Tyr Arg
35 40 45
Arg Pro Gln Tyr Ser Leu Ala Glu Leu Leu Ala Gln Cys Asp Pro Asn
50 55 60
Ala Glu Ile Ser Ala Glu Glu Arg Glu Trp Leu Asp Ala Pro Ala Thr
65 70 75 80
Gly Gln Glu Glu Ile
85

<210> 9
<211> 24
<212> PRT
<213> Artificial Sequence

<220>
<223> T54 to K77 fragment of E. coli Maze

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Thr Leu Ala Glu Leu Val Asn Asp Ile Thr Pro Glu Asn Leu His Glu
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Asn Ile Asp Trp Gly Glu Pro Lys
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<210> 10
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> N60 to K77 fragment of E. coli Maze

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1 5 10 15
Pro Lys

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<212> RNA	
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<223> synthetic RNA substrate	
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uaagaaggag auauacauau gaaucaaauc	30
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<211> 50	
<212> DNA	
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<223> single stranded oligonucleotide	
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<210> 13	
<211> 50	
<212> DNA	
<213> Artificial Sequence	
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<223> single stranded oligonucleotide	
<400> 13	
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<211> 23	
<212> DNA	
<213> Artificial Sequence	
<400> 14	
agatctcgat cccgcaaatt aat	23
<210> 15	
<211> 27	
<212> DNA	
<213> Artificial Sequence	
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<223> DNA primer	
<400> 15	
ttagagatca atttctgcc gttttac	27
<210> 16	
<211> 22	
<212> DNA	
<213> Artificial Sequence	
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<223> DNA primer	
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ttaaagatcg tcaacgtaac cg	22

<210> 17
<211> 22
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<220>
<223> DNA primer

<400> 17
tgctctttat cccacgggca gc 22

<210> 18
<211> 24
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<220>
<223> DNA primer

<400> 18
gcccagttca ccgcgaagat cgtc 24

<210> 19
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> DNA primer

<400> 19
ggttttgatt tgctcccaac gggcaag 27

<210> 20
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<220>
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<400> 20
catttcctcc tccagtttag cctggtc 27

<210> 21
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<220>
<223> DNA primer

<400> 21
ttgccagact tcttcattg ttctgag 27

<210> 22
<211> 24
<212> DNA
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<220>
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<400> 22
gatccccaca atgcggtgac gagt 24

<210> 23
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 <400> 23
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 <400> 24
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 <210> 25
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 <220>
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 <400> 25
 gcgttcggtcg tcggcccaac cgga 24

 <210> 26
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 <212> RNA
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 <220>
 <223> antisense RNA

 <400> 26
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 <210> 27
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 <212> DNA
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 <220>
 <223> complementary DNA

 <400> 27
 gatttgattc atatgtatat ctccttctta 30

 <210> 28
 <211> 22
 <212> DNA
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 <220>
 <223> DNA primer

 <400> 28
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<210> 29
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<220>
<223> DNA fragment

<400> 29
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<210> 30
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<212> DNA
<213> Artificial Sequence

<400> 30
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<210> 31
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> DNA fragment

<400> 31
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18

<210> 32
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<212> DNA
<213> Artificial Sequence

<220>
<223> DNA fragment

<400> 32
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12

<210> 33
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<212> DNA
<213> Artificial Sequence

<220>
<223> multiple cloning site

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<210> 34
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> DNA primer

<400> 34
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<210> 35
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> DNA primer

<400> 35
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<210> 36
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> DNA primer

<400> 36
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<210> 37
<211> 16
<212> DNA
<213> Artificial Sequence

<220>
<223> DNA primer

<400> 37
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<210> 38
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> DNA primer

<400> 38
tgtcctctat ggagttacta gtg 23

<210> 39
<211> 330
<212> DNA
<213> Bacillus halodurans

<400> 39
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ggttttgctg tggtttgctc aattaccaga caacaaaaag gttatccttt tgaaatagaa 180
ataccaccg ggttacctat tgaaggggtt attcttactg accaagtaaa aagtctggat 240
tggagagcaa gaaactttca cattaaagga caagcaccag aggaaactgt tactgattgt 300
ttacaactta ttcatacatt tttatcttaa 330

<210> 40
<211> 363
<212> DNA
<213> Staphylococcus epidermidis

<400> 40
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gggggagtaa gacctgtagt tatcattcaa aatgatactg gtaataaata tagtccaact 120
gtaattgtag ctgcgattac tgatgggatt aataaagcga aaataccaac ccacgtagaa 180

attgaaaaga aaaagtataa attagacaaa gattcagtta ttcttcttga acaaattaga 240
acactagata aaaagcggtt aaaagaaaaa ttaacatttt tatcagagag taaaatgata 300
gaggttgata atgccttaga tattagtttg ggattaaata actttgatca tcataaatct 360
taa 363

<210> 41
<211> 411
<212> DNA
<213> *Staphylococcus aureus*

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gggggagtc gacctgtagt cataattcaa aatgatactg gtaataaata tagtcctaca 120
gttattgttg cggcaataac tggtaggatt aataaagcga aaataccgac acatgtagag 180
attgaaaaga aaaagtataa gttggataaa gactcagtta tattattaga acaaattcgt 240
acacttgata aaaaacgatt gaaagaaaaa ctgacgtact tatccgatga taaaatgaaa 300
gaagtagata atgcactaat gattagttta gggctgaatg cagtagctca accagaaaaa 360
ttagcgctct attatatgta tttttcagag ataaataaaa tattgatata a 411

<210> 42
<211> 351
<212> DNA
<213> *Bacillus subtilis*

<400> 42
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caaggcgggg tgcgcccggg tttagtgtat caaaatgaca tcggaaatcg cttcagccca 120
actgctattg ttgcagccat aacagcacia atacagaaag cgaaattacc aaccacgctc 180
gaaatcgatg caaaacgcta cggttttgaa agagattccg ttattttgct ggagcaaatt 240
cggacgattg acaagcaaag gttaacggat aagattactc atctggatga tgaatgatg 300
gataagggtg atgaagcctt acaaatacgt ttggcactca ttgattttta g 351

<210> 43
<211> 324
<212> DNA
<213> *Neisseria meningitides*

<400> 43
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gaaatcaaaa agacacgtcc ttgtgtcgta gtctctctc ctgaaataca caactatctc 120
aagactgtgc tgatcggttc catgacgagc ggaagccgct ctgccccgtt ccgcgtcaat 180
gtccgctttc aggataaaga cggtttgctt ttgcccgaac agattagggc tgtggataaa 240
gccggattgg tcaaacatct tggcaattta gacaacagta cggctgaaaa actgtttgca 300
gtattgcagg agatgtttgc ctga 324

<210> 44
<211> 366
<212> DNA
<213> *Morganella morganii*

<400> 44
atgcgcgggc ggctggtcag gaggaaatct gacatggaaa gaggggaaat ctggcttgct 60
tcgcttgacc ctaccgcagg tcatgagcag cagggaacgc ggccggtaact gattgtcacg 120
ccggtgctt ttaaccgcgt gaccgcctg cctgttggtg tgcccgtgac cagcggaggt 180
aattttgccc gcacagcagg ctttgctgtg tcgcttgacg gcgccggcat acgtaccacc 240
ggcgttgctg gttgcgatca accccggacg atcgatatga aagcccgcgg cggcaaacga 300
ctcgaacggg tgccagagac tatcatggac gacgttcttg gccgtctggc caccatcctg 360
acctga 366

<210> 45
<211> 321
<212> DNA
<213> *Mycobacterium tuberculosis*

<400> 45
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atgggaacaa agacacgggt cctgggtggat cagatccgga cgatcggcat cgtctatgtg 240
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gcacgatacc ttggtctgtg a                                     321

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<210> 46
<211> 109
<212> PRT
<213> Bacillus halodurans

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      20          25          30
Pro Lys Leu Phe Asn Lys Asn Thr Gly Phe Ala Val Val Cys Pro Ile
      35          40          45
Thr Arg Gln Gln Lys Gly Tyr Pro Phe Glu Ile Glu Ile Pro Pro Gly
      50          55          60
Leu Pro Ile Glu Gly Val Ile Leu Thr Asp Gln Val Lys Ser Leu Asp
      65          70          75          80
Trp Arg Ala Arg Asn Phe His Ile Lys Gly Gln Ala Pro Glu Glu Thr
      85          90          95
Val Thr Asp Cys Leu Gln Leu Ile His Thr Phe Leu Ser
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<210> 47
<211> 120
<212> PRT
<213> Staphylococcus epidermidis

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Gly Ser Glu Gln Gly Gly Val Arg Pro Val Val Ile Ile Gln Asn Asp
      20          25          30
Thr Gly Asn Lys Tyr Ser Pro Thr Val Ile Val Ala Ala Ile Thr Asp
      35          40          45
Gly Ile Asn Lys Ala Lys Ile Pro Thr His Val Glu Ile Glu Lys Lys
      50          55          60
Lys Tyr Lys Leu Asp Lys Asp Ser Val Ile Leu Leu Glu Gln Ile Arg
      65          70          75          80
Thr Leu Asp Lys Lys Arg Leu Lys Glu Lys Leu Thr Phe Leu Ser Glu
      85          90          95
Ser Lys Met Ile Glu Val Asp Asn Ala Leu Asp Ile Ser Leu Gly Leu
      100          105          110
Asn Asn Phe Asp His His Lys Ser
      115          120

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<210> 48
<211> 136
<212> PRT
<213> Staphylococcus aureus

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<400> 48
Met Ile Arg Arg Gly Asp Val Tyr Leu Ala Asp Leu Ser Pro Val Gln
 1          5          10          15
Gly Ser Glu Gln Gly Gly Val Arg Pro Val Val Ile Ile Gln Asn Asp
      20          25          30
Thr Gly Asn Lys Tyr Ser Pro Thr Val Ile Val Ala Ala Ile Thr Gly
      35          40          45
Arg Ile Asn Lys Ala Lys Ile Pro Thr His Val Glu Ile Glu Lys Lys
      50          55          60

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Lys Tyr Lys Leu Asp Lys Asp Ser Val Ile Leu Leu Glu Gln Ile Arg
 65 70 75 80
 Thr Leu Asp Lys Lys Arg Leu Lys Glu Lys Leu Thr Tyr Leu Ser Asp
 85 90 95
 Asp Lys Met Lys Glu Val Asp Asn Ala Leu Met Ile Ser Leu Gly Leu
 100 105 110
 Asn Ala Val Ala Gln Pro Glu Lys Leu Gly Val Tyr Tyr Met Tyr Phe
 115 120 125
 Ser Glu Ile Asn Lys Ile Leu Ile
 130 135

<210> 49
 <211> 116
 <212> PRT
 <213> Bacillus subtilis

<400> 49
 Met Ile Val Lys Arg Gly Asp Val Tyr Phe Ala Asp Leu Ser Pro Val
 1 5 10 15
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 20 25 30
 Asp Ile Gly Asn Arg Phe Ser Pro Thr Ala Ile Val Ala Ala Ile Thr
 35 40 45
 Ala Gln Ile Gln Lys Ala Lys Leu Pro Thr His Val Glu Ile Asp Ala
 50 55 60
 Lys Arg Tyr Gly Phe Glu Arg Asp Ser Val Ile Leu Leu Glu Gln Ile
 65 70 75 80
 Arg Thr Ile Asp Lys Gln Arg Leu Thr Asp Lys Ile Thr His Leu Asp
 85 90 95
 Asp Glu Met Met Asp Lys Val Asp Glu Ala Leu Gln Ile Ser Leu Ala
 100 105 110
 Leu Ile Asp Phe
 115

<210> 50
 <211> 115
 <212> PRT
 <213> Neisseria meningitides

<400> 50
 Met Tyr Ile Pro Asp Lys Gly Asp Ile Phe His Leu Asn Phe Asp Pro
 1 5 10 15
 Ser Ser Gly Lys Glu Ile Lys Gly Gly Arg Phe Ala Leu Ala Leu Ser
 20 25 30
 Pro Lys Ala Phe Asn Arg Ala Thr Gly Leu Val Phe Ala Cys Pro Ile
 35 40 45
 Ser Gln Gly Asn Ala Ala Ala Arg Ser Ser Gly Met Ile Ser Thr
 50 55 60
 Leu Leu Gly Ala Gly Thr Glu Thr Gln Gly Asn Val His Cys His Gln
 65 70 75 80
 Leu Lys Ser Leu Asp Trp Gln Ile Arg Lys Ala Ser Phe Lys Glu Thr
 85 90 95
 Val Pro Asp Tyr Val Leu Asp Asp Val Leu Ala Arg Ile Gly Ala Val
 100 105 110
 Leu Phe Asp
 115

<210> 51
 <211> 121
 <212> PRT
 <213> *Morganella morgani*

<400> 51
 Met Arg Arg Arg Leu Val Arg Arg Lys Ser Asp Met Glu Arg Gly Glu
 1 5 10 15
 Ile Trp Leu Val Ser Leu Asp Pro Thr Ala Gly His Glu Gln Gly
 20 25 30
 Thr Arg Pro Val Leu Ile Val Thr Pro Ala Ala Phe Asn Arg Val Thr
 35 40 45
 Arg Leu Pro Val Val Val Pro Val Thr Ser Gly Gly Asn Phe Ala Arg
 50 55 60
 Thr Ala Gly Phe Ala Val Ser Leu Asp Gly Ala Gly Ile Arg Thr Thr
 65 70 75 80
 Gly Val Val Arg Cys Asp Gln Pro Arg Thr Ile Asp Met Lys Ala Arg
 85 90 95
 Gly Gly Lys Arg Leu Glu Arg Val Pro Glu Thr Ile Met Asp Asp Val
 100 105 110
 Leu Gly Arg Leu Ala Thr Ile Leu Thr
 115 120

<210> 52
 <211> 118
 <212> PRT
 <213> *Mycobacterium tuberculosis*

<400> 52
 Met Met Arg Arg Gly Glu Ile Trp Gln Val Asp Leu Asp Pro Ala Arg
 1 5 10 15
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 20 25 30
 Arg Ala Asn Ala Thr Ala Thr Arg Leu Gly Arg Gly Val Ile Thr Val
 35 40 45
 Val Pro Val Thr Ser Asn Ile Ala Lys Val Tyr Pro Phe Gln Val Leu
 50 55 60
 Leu Ser Ala Thr Thr Thr Gly Leu Gln Val Asp Cys Lys Ala Gln Ala
 65 70 75 80
 Glu Gln Ile Arg Ser Ile Ala Thr Glu Arg Leu Leu Arg Pro Ile Gly
 85 90 95
 Arg Val Ser Ala Ala Glu Leu Ala Gln Leu Asp Glu Ala Leu Lys Leu
 100 105 110
 His Leu Asp Leu Trp Ser
 115

<210> 53
 <211> 243
 <212> DNA
 <213> *Deinococcus radiodurans*

<400> 53
 atgacgagtc aaattcagaa atggggcaac agcctcgcgc tccgcattcc caaagctctg 60
 gcgcagcagg tgggactgac gcagagttca gaagtggagc tgcttcttca ggacgggtcag 120
 attgtcatcc ggccagttcc tgctcggcag tacgatctcg ccgcgctgct ggccgaaatg 180
 acacctgaaa atctgcatgg ggaaacagac tggggcgcac tggaaggacg cgaggaatgg 240
 taa 243

<210> 54
<211> 246
<212> DNA
<213> *Bacillus halodurans*

<400> 54
gtgacactca tgactactat acaaaagtgg ggaaatagtt tagctgttcg tattccgaac 60
cattatgcta aacatattaa cgttacgcaa ggatctgaaa ttgaactaag cttagggagt 120
gatcaaacga ttatttttaa gcctaaaaaa agaaagccaa cattagagga attagtggca 180
aaaatcactc ctgaaaacag acataacgaa attgatttcg ggagaacagg aaaggaattg 240
ttgtaa 246

<210> 55
<211> 258
<212> DNA
<213> *E. coli* Plasmid R100

<400> 55
atgcatacca cccgactgaa gaggggtggc ggctcagtta tgctgaccgt cccaccggca 60
ctgctgaatg cgctgtctct gggcacagat aatgaagttg gcatggtcat tgataatggc 120
cggctgattg ttgagccgta cagacgcccg caatattcac tggctgagct actggcacag 180
tgtgatccga atgctgaaat atcagctgaa gaacgagaat ggctggatgc accggcgact 240
ggtcaggagg.aaatctga 258

<210> 56
<211> 294
<212> DNA
<213> *E. coli* Plasmid R466b

<400> 56
atgttatatt taaatataac ttttatggag ggaaaaatgc ataccactcg actgaagaag 60
gttgggggct cagtcatgct gaccgtccca ccggcactgc tgaatgcgct gtcgctgggt 120
aaccaactga aagttggcat ggtcattgat aatggccggc tgattgtgga gccgcacaga 180
cgcccgagc attcaactggc tgagctgttg gcacagtgcg atccgaacgc tgaatctcg 240
gcagaagaac gtgaatggct ggatgcgccc gcggctggtc aggaggaaat ctga 294

<210> 57
<211> 258
<212> DNA
<213> *Escherichia coli*

<400> 57
gtgcagatgc gtattaccat aaaaagatgg gggaacagtg caggtatggc cattcccaat 60
atcgtaatga aagaacttaa cttacagccg gggcagagcg tggaaagtga ggtgagcaac 120
aaccaactga ttctgacacc catctccagg cgctactcgc ttgatgaact gctggcacag 180
tgtgacatga acgcccggga acttagcgag caggatgtct ggggtaaact caccctcg 240
ggtgacgaaa tatggtaa 258

<210> 58
<211> 255
<212> DNA
<213> *Pseudomonas putida*

<400> 58
atgcagatca agattcaaca gtggggcaac agcggcgcga tccgcttgcc cgccgcagta 60
ctcaagcaga tgcgcctcgg tgtcggctcc accctgagcc ttgacacaac gggtgagacg 120
atgggtgctca aaccgctcag gtcgaaaccc aagtacacc ttgaggaact gatggcccag 180
tgtgacctga gtgcaccgga gccagaggac atggccgact ggaatgccat gcgcccagtg 240
gggcgtgaag tgtga 255

<210> 59
<211> 260
<212> DNA
<213> Photobacterium profundum

<400> 59
gtgcaatgag aactcagata agaaagatcg gtaactcact tggttcaatt attcctgcca 60
cttttattcg tcagcttgaa ctggcagagg gcgcagaaat tgatgtttaa acggttgatg 120
gaaaaattgt gattgagcca attagaaaaa tgaaaaaacg tttcccatc agtgagcgtg 180
aattactaag tggattggat gcacacactg ctcatgctga cgaactgggt gtaatttcta 240
cccaggagct aggcgaataa 260

<210> 60
<211> 80
<212> PRT
<213> Deinococcus radiodurans

<400> 60
Met Thr Ser Gln Ile Gln Lys Trp Gly Asn Ser Leu Ala Leu Arg Ile
1 5 10 15
Pro Lys Ala Leu Ala Gln Gln Val Gly Leu Thr Gln Ser Ser Glu Val
20 25 30
Glu Leu Leu Leu Gln Asp Gly Gln Ile Val Ile Arg Pro Val Pro Ala
35 40 45
Arg Gln Tyr Asp Leu Ala Ala Leu Leu Ala Glu Met Thr Pro Glu Asn
50 55 60
Leu His Gly Glu Thr Asp Trp Gly Ala Leu Glu Gly Arg Glu Glu Trp
65 70 75 80

<210> 61
<211> 81
<212> PRT
<213> Bacillus halodurans

<400> 61
Met Thr Leu Met Thr Thr Ile Gln Lys Trp Gly Asn Ser Leu Ala Val
1 5 10 15
Arg Ile Pro Asn His Tyr Ala Lys His Ile Asn Val Thr Gln Gly Ser
20 25 30
Glu Ile Glu Leu Ser Leu Gly Ser Asp Gln Thr Ile Ile Leu Lys Pro
35 40 45
Lys Lys Arg Lys Pro Thr Leu Glu Glu Leu Val Ala Lys Ile Thr Pro
50 55 60
Glu Asn Arg His Asn Glu Ile Asp Phe Gly Arg Thr Gly Lys Glu Leu
65 70 75 80
Leu

<210> 62
<211> 85
<212> PRT
<213> E. coli PemI plasmid R100

<400> 62
Met His Thr Thr Arg Leu Lys Arg Val Gly Gly Ser Val Met Leu Thr
1 5 10 15
Val Pro Pro Ala Leu Leu Asn Ala Leu Ser Leu Gly Thr Asp Asn Glu
20 25 30
Val Gly Met Val Ile Asp Asn Gly Arg Leu Ile Val Glu Pro Tyr Arg
35 40 45
Arg Pro Gln Tyr Ser Leu Ala Glu Leu Leu Ala Gln Cys Asp Pro Asn
50 55 60
Ala Glu Ile Ser Ala Glu Glu Arg Glu Trp Leu Asp Ala Pro Ala Thr
65 70 75 80

Gly Gln Glu Glu Ile
85

<210> 63
<211> 97
<212> PRT
<213> E. coli PemI plasmid R466b

<400> 63
Met Leu Tyr Leu Asn Ile Thr Phe Met Glu Gly Lys Met His Thr Thr
1 5 10 15
Arg Leu Lys Lys Val Gly Gly Ser Val Met Leu Thr Val Pro Pro Ala
20 25 30
Leu Leu Asn Ala Leu Ser Leu Gly Thr Asp Asn Glu Val Gly Met Val
35 40 45
Ile Asp Asn Gly Arg Leu Ile Val Glu Pro His Arg Arg Pro Gln Tyr
50 55 60
Ser Leu Ala Glu Leu Leu Ala Gln Cys Asp Pro Asn Ala Glu Ile Ser
65 70 75 80
Ala Glu Glu Arg Glu Trp Leu Asp Ala Pro Ala Ala Gly Gln Glu Glu
85 90 95
Ile

<210> 64
<211> 85
<212> PRT
<213> Escherichia coli

<400> 64
Met Gln Met Arg Ile Thr Ile Lys Arg Trp Gly Asn Ser Ala Gly Met
1 5 10 15
Val Ile Pro Asn Ile Val Met Lys Glu Leu Asn Leu Gln Pro Gly Gln
20 25 30
Ser Val Glu Ala Gln Val Ser Asn Asn Gln Leu Ile Leu Thr Pro Ile
35 40 45
Ser Arg Arg Tyr Ser Leu Asp Glu Leu Leu Ala Gln Cys Asp Met Asn
50 55 60
Ala Ala Glu Leu Ser Glu Gln Asp Val Trp Gly Lys Ser Thr Pro Ala
65 70 75 80
Gly Asp Glu Ile Trp
85

<210> 65
<211> 84
<212> PRT
<213> Pseudomonas putida

<400> 65
Met Gln Ile Lys Ile Gln Gln Trp Gly Asn Ser Ala Ala Ile Arg Leu
1 5 10 15
Pro Ala Ala Val Leu Lys Gln Met Arg Leu Gly Val Gly Ser Thr Leu
20 25 30
Ser Leu Asp Thr Thr Gly Glu Thr Met Val Leu Lys Pro Val Arg Ser
35 40 45
Lys Pro Lys Tyr Thr Leu Glu Glu Leu Met Ala Gln Cys Asp Leu Ser
50 55 60
Ala Pro Glu Pro Glu Asp Met Ala Asp Trp Asn Ala Met Arg Pro Val
65 70 75 80
Gly Arg Glu Val

<210> 66
 <211> 85
 <212> PRT
 <213> Photobacterium profundum

<400> 66
 Ala Met Arg Thr Gln Ile Arg Lys Ile Gly Asn Ser Leu Gly Ser Ile
 1 5 10 15
 Ile Pro Ala Thr Phe Ile Arg Gln Leu Glu Leu Ala Glu Gly Ala Glu
 20 25 30
 Ile Asp Val Lys Thr Val Asp Gly Lys Ile Val Ile Glu Pro Ile Arg
 35 40 45
 Lys Met Lys Lys Arg Phe Pro Phe Ser Glu Arg Glu Leu Leu Ser Gly
 50 55 60
 Leu Asp Ala His Thr Ala His Ala Asp Glu Leu Val Val Ile Ser Thr
 65 70 75 80
 Gln Glu Leu Gly Glu
 85

<210> 67
 <211> 228
 <212> DNA
 <213> Homo sapiens

<400> 67
 atgggtccag catctgttcc gactacctgt tgctttaacc tggcgaaccg caaaattccg 60
 ctgcagcgcc tggaaagcta tcgccgtatt acctctggca aatgcccgca gaaagcgggtg 120
 atcttttaaaa ccaaaactggc gaaagatatt tgcgcggatc cgaaaaaaaa atgggtgcag 180
 gattctatga aatatctgga tcagaaatct ccgaccccgga aaccgtaa 228

<210> 68
 <211> 73
 <212> PRT
 <213> Homo sapiens

<400> 68
 Gly Pro Ala Ser Pro Thr Thr Cys Cys Phe Asn Leu Ala Asn Arg Lys
 1 5 10 15
 Ile Pro Leu Gln Arg Leu Glu Ser Tyr Arg Arg Ile Thr Ser Gly Lys
 20 25 30
 Cys Pro Gln Lys Ala Val Ile Phe Lys Thr Lys Leu Ala Lys Asp Ile
 35 40 45
 Cys Ala Asp Pro Lys Lys Lys Trp Val Gln Asp Ser Met Lys Tyr Leu
 50 55 60
 Asp Gln Lys Ser Pro Thr Pro Lys Pro
 65 70

<210> 69
 <211> 357
 <212> DNA
 <213> Mycobacterium tuberculosis

<400> 69
 gtgatgcgcc gcggtgagat ttggcaggtc gatctcgacc ccgctcgagg tagcgaagcg 60
 aacaaccagc gccccgccgt cgctcgtcagc aacgaccggg ccaacgcgac cgccacgcgt 120
 cttgggcgcg gcgtcatcac cgctgtgccg gtgacgagca acatcgccaa ggtctatccg 180
 tttcaggtgt tgttgtcggc caccactact ggtctccagg tcgactgcaa ggcgcaggcc 240
 gagcaaatac gatcgattgc taccgagcgg ttgctccggc caatcgggcg agtttcagcc 300
 gccgaacttg cccagctcga tgaggctttg aaactgcatc tcgacttatg gtcgtag 357

<210> 70
<211> 282
<212> DNA
<213> Mycobacterium tuberculosis

<400> 70
atgctgcgcg gtgagatctg gcaggtcgac ctggatccgg cccgcggcag cgcgggcaaat 60
atgcggcggc cagcggtaat tgtcagcaac gacagggcca acgctgccgc gatacgtctc 120
gaccgaggcg tggcgccggg tgtcccggtt accagcaaca ccgaaaaggt cccattcca 180
gggtgtgttg ccggcagcga gcggtggcct ggccgtcgat tcgaagcgcg aggcccagca 240
ggttggatcc gtcgctgcgc aacgtctccc ctgccgagct ga 282

<210> 71
<211> 345
<212> DNA
<213> Mycobacterium tuberculosis

<400> 71
gtggtgatta gtcgtgccga gatctactgg gctgacctcg ggccgccatc aggagtcag 60
ccggcgaaag gccgcccggg gtcctgaatc cagtcagatc cgtacaacgc aagtcgcctt 120
gccactgtga tcgcagcggg gatcacgtcc aatacggcgc tggcggaat gcccggaac 180
gtgttcttgc ccgcgaccac aacgcgactg ccacgtgact cggtcgtcaa cgtcacggcg 240
attgtcacgc tcaacaagac tgacctcacc gaccgagttg gggaggtgcc agcgagcttg 300
atgcacgagg ttgaccgagg acttcgtcgc gtactggacc tttga 345

<210> 72
<211> 309
<212> DNA
<213> Mycobacterium tuberculosis

<400> 72
atgcggcgcg gtgaattgtg gtttgccgcc acacctggtg gtgacagacc agtacttgtc 60
cttaccagag atccggtggc agaccgcac gccgcggtcg ttgtggtggc cctaaccgc 120
acccgccgag gcctggtgtc ggaattggag ctcacggccg tcgaaaaccg tgttccgagc 180
gactgcgtcg tcaacttcga caacattcat acgttgccac gcaccgcatt ccgacgccgc 240
atcacccggc tgtccccggc ccgcctgcac gaagcctgtc aaacactecg ggcgagcacg 300
gggtgttga 309

<210> 73
<211> 330
<212> DNA
<213> Mycobacterium tuberculosis

<400> 73
gtgaccgcac ttccggcgcg cggagagggtg tgggtggtgtg agatggctga gatcggtcgg 60
cgaccagtgc tcgtgctgtc gcgcgatgcc gcgatccctc ggctgcgacg cgcacttgtc 120
gcgccttgca ccacgaccat ccgagggcta gccagtgagg ttgttcttga acccggttcc 180
gaccgatcc cgcgccgttc ccggtggaat ttggactcag tcgaaagtgt ctcgggtcgcg 240
gtattggtga atcggcttgg ccgcctcgcc gacatccgga tgcgcgccat ctgcacggcc 300
ctcgaggtcg ccgtcgattg ctctcgatga 330

<210> 74
<211> 118
<212> PRT
<213> Mycobacterium tuberculosis

<400> 74
Met Met Arg Arg Gly Glu Ile Trp Gln Val Asp Leu Asp Pro Ala Arg
1 5 10 15
Gly Ser Glu Ala Asn Asn Gln Arg Pro Ala Val Val Val Ser Asn Asp
20 25 30
Arg Ala Asn Ala Thr Ala Thr Arg Leu Gly Arg Gly Val Ile Thr Val
35 40 45
Val Pro Val Thr Ser Asn Ile Ala Lys Val Tyr Pro Phe Gln Val Leu
50 55 60

Leu Ser Ala Thr Thr Thr Gly Leu Gln Val Asp Cys Lys Ala Gln Ala
 65 70 75 80
 Glu Gln Ile Arg Ser Ile Ala Thr Glu Arg Leu Leu Arg Pro Ile Gly
 85 90 95
 Arg Val Ser Ala Ala Glu Leu Ala Gln Leu Asp Glu Ala Leu Lys Leu
 100 105 110
 His Leu Asp Leu Trp Ser
 115

<210> 75
 <211> 93
 <212> PRT
 <213> Mycobacterium tuberculosis

<400> 75
 Met Leu Arg Gly Glu Ile Trp Gln Val Asp Leu Asp Pro Ala Arg Gly
 1 5 10 15
 Ser Ala Ala Asn Met Arg Arg Pro Ala Val Ile Val Ser Asn Asp Arg
 20 25 30
 Ala Asn Ala Ala Ile Arg Leu Asp Arg Gly Val Val Pro Val Val
 35 40 45
 Pro Val Thr Ser Asn Thr Glu Lys Val Pro Ile Pro Gly Val Val Ala
 50 55 60
 Gly Ser Glu Arg Trp Pro Gly Arg Arg Phe Glu Gly Ala Gly Pro Ala
 65 70 75 80
 Gly Trp Ile Arg Arg Cys Ala Thr Ser Pro Leu Pro Ser
 85 90

<210> 76
 <211> 114
 <212> PRT
 <213> Mycobacterium tuberculosis

<400> 76
 Met Val Ile Ser Arg Ala Glu Ile Tyr Trp Ala Asp Leu Gly Pro Pro
 1 5 10 15
 Ser Gly Ser Gln Pro Ala Lys Arg Arg Pro Val Leu Val Ile Gln Ser
 20 25 30
 Asp Pro Tyr Asn Ala Ser Arg Leu Ala Thr Val Ile Ala Ala Val Ile
 35 40 45
 Thr Ser Asn Thr Ala Leu Ala Met Pro Gly Asn Val Phe Leu Pro
 50 55 60
 Ala Thr Thr Thr Arg Leu Pro Arg Asp Ser Val Val Asn Val Thr Ala
 65 70 75 80
 Ile Val Thr Leu Asn Lys Thr Asp Leu Thr Asp Arg Val Gly Glu Val
 85 90 95
 Pro Ala Ser Leu Met His Glu Val Asp Arg Gly Leu Arg Arg Val Leu
 100 105 110
 Asp Leu

<210> 77
 <211> 102
 <212> PRT
 <213> Mycobacterium tuberculosis

<400> 77
 Met Arg Arg Gly Glu Leu Trp Phe Ala Ala Thr Pro Gly Gly Asp Arg
 1 5 10 15
 Pro Val Leu Val Leu Thr Arg Asp Pro Val Ala Asp Arg Ile Gly Ala
 20 25 30
 Val Val Val Val Ala Leu Thr Arg Thr Arg Arg Gly Leu Val Ser Glu
 35 40 45

Leu Glu Leu Thr Ala Val Glu Asn Arg Val Pro Ser Asp Cys Val Val
 50 55 60
 Asn Phe Asp Asn Ile His Thr Leu Pro Arg Thr Ala Phe Arg Arg Arg
 65 70 75 80
 Ile Thr Arg Leu Ser Pro Ala Arg Leu His Glu Ala Cys Gln Thr Leu
 85 90 95
 Arg Ala Ser Thr Gly Cys
 100

<210> 78
 <211> 109
 <212> PRT
 <213> Mycobacterium tuberculosis

<400> 78
 Met Thr Ala Leu Pro Ala Arg Gly Glu Val Trp Trp Cys Glu Met Ala
 1 5 10 15
 Glu Ile Gly Arg Arg Pro Val Val Val Leu Ser Arg Asp Ala Ala Ile
 20 25 30
 Pro Arg Leu Arg Arg Ala Leu Val Ala Pro Cys Thr Thr Thr Ile Arg
 35 40 45
 Gly Leu Ala Ser Glu Val Val Leu Glu Pro Gly Ser Asp Pro Ile Pro
 50 55 60
 Arg Arg Ser Ala Val Asn Leu Asp Ser Val Glu Ser Val Ser Val Ala
 65 70 75 80
 Val Leu Val Asn Arg Leu Gly Arg Leu Ala Asp Ile Arg Met Arg Ala
 85 90 95
 Ile Cys Thr Ala Leu Glu Val Ala Val Asp Cys Ser Arg
 100 105

<210> 79
 <211> 351
 <212> DNA
 <213> Bacillus anthracis

<400> 79
 ttgattgtaa aacgcggcga cgtgtatttt gcagaccttt cccagttgt tggttctgag 60
 caaggagggtg ttcgtccggt tcttgtcatt caaaatgaca tcggaaatcg ttttagtcca 120
 acggtgattg tagcggctat tactgcacag attcaaaaag cgaaattacc cactcatgtg 180
 gaaattgatg cgaaaaagta cggttttgag agagattctg ttattttact tgagcagatt 240
 cgaacaatcg ataagcagcg cttaacggac aaaatcactc acttagatga agtgatgatg 300
 attcgtgtag atgaagcgcg acaaattagt ttaggactaa tagattttta a 351

<210> 80
 <211> 116
 <212> PRT
 <213> Bacillus anthracis

<400> 80
 Met Ile Val Lys Arg Gly Asp Val Tyr Phe Ala Asp Leu Ser Pro Val
 1 5 10 15
 Val Gly Ser Glu Gln Gly Gly Val Arg Pro Val Leu Val Ile Gln Asn
 20 25 30
 Asp Ile Gly Asn Arg Phe Ser Pro Thr Val Ile Val Ala Ala Ile Thr
 35 40 45
 Ala Gln Ile Gln Lys Ala Lys Leu Pro Thr His Val Glu Ile Asp Ala
 50 55 60
 Lys Lys Tyr Gly Phe Glu Arg Asp Ser Val Ile Leu Leu Glu Gln Ile
 65 70 75 80
 Arg Thr Ile Asp Lys Gln Arg Leu Thr Asp Lys Ile Thr His Leu Asp
 85 90 95
 Glu Val Met Met Ile Arg Val Asp Glu Ala Leu Gln Ile Ser Leu Gly
 100 105 110

Leu Ile Asp Phe
115

<210> 81
<211> 348
<212> DNA
<213> *Pseudomonas putida*

<400> 81
gtgaaacggg tgaatttcgc caggggtgat attgttcgcg tcaacctgga cccaacagtc 60
gggcggaac agcagggtc cggccgacct gcactgggtac ttactccggc tgcgttcaat 120
gcttcaggcc tggctgtaat catcccgatc actcaagggtg gggatttcgc gaggcagtcg 180
ggtttcgctg tcacgctcag cggtgcgggc acgcagactc aggggggtgat gctttgcaac 240
caggtgcgca cagtcgacct tgaagcacga tttgccaaagc gcatagagtc ggtgcctgaa 300
gctgtcatcc tggatgçact ggcgçgtgtg caaacçctat tcgattaa 348

<210> 82
<211> 345
<212> DNA
<213> *Mycobacterium celatum*

<400> 82
tgaattgctc tgacggaacg cggcgacatc tacatcgttt cgcttgaccc gacgtcggga 60
catgagcaga gcggcacgcg ccaggtattg gtcgtgtccc cgggcgcgtt taatcgçctg 120
acgaaaacac cggtcgtgct acçtataaca cgcggcgçga actttgcccç aacggcaggg 180
ttcgctgtct cgctgaccga tgcgggtact cgcaccgcçg gcgtaatacg ctgcgatcag 240
cctcgctcga ttgatatccg cggccgtaaa ggccgcaagg ttgaacgtgt gççgtçtggg 300
gttçttgacg aagcgttggc caagctcgcc acgatçttga çttga 345

<210> 83
<211> 366
<212> DNA
<213> *Shigella flexneri* 2a str. 301

<400> 83
atggtaaagg cacggacgcc acatcgtggg gagatctggg attttaaccc tgatccgggt 60
gccgggcatg aacttcaggg gccacattat tgcattgtgg taacggacaçaa aaaactcaac 120
aatgttttaa aagttgctat gtgctgcccç atttcaacag gggçaaatgc agcacgttcc 180
acaggggtga cggtgaaçgt cctccccçgt gatacgcaaa ccggtaacct gcatggcggt 240
gtactttgtc accagçtaaa agccgçgat çttattgccc gtggcgçtaa atttçatacc 300
gttgccgatg aaaaattgat tagtgaagtt atcagtaaac tgggtgaattt aatcgaccca 360
caataa 366

<210> 84
<211> 351
<212> DNA
<213> *E. coli*

<400> 84
atggtaaaga aaagtgaatt tgaacgggga gacattgtgc tggttggçtt tgatccagca 60
agcggccatg aacagcaagg tgctgggtcga cctgcgçttg tgçtçtccgt tcaagcçttt 120
aatcaactgg gaatgacgct ggtggçcccc attacgcagg gcggaaattt tgçccgçttat 180
gccggattta gcgttççttt acattgcgaç gaaggcgatg tgcacggcgç ggtgçtgggtg 240
aatcaggtgc ggatgatgga tçtacacgçc cggçtgççaa agcgtattgg tçtggçtgcg 300
gatgaggtgg tggaagaggc gttattacgc ttgcaggcgç tgggtggaata a 351

<210> 85
<211> 115
<212> PRT
<213> *Pseudomonas putida*

<400> 85
Met Lys Arg Leu Lys Phe Ala Arg Gly Asp Ile Val Arg Val Asn Leu
1 5 10 15

Asp Pro Thr Val Gly Arg Glu Gln Gln Gly Ser Gly Arg Pro Ala Leu
 20 25 30
 Val Leu Thr Pro Ala Ala Phe Asn Ala Ser Gly Leu Ala Val Ile Ile
 35 40 45
 Pro Ile Thr Gln Gly Gly Asp Phe Ala Arg His Ala Gly Phe Ala Val
 50 55 60
 Thr Leu Ser Gly Ala Gly Thr Gln Thr Gln Gly Val Met Leu Cys Asn
 65 70 75 80
 Gln Val Arg Thr Val Asp Leu Glu Ala Arg Phe Ala Lys Arg Ile Glu
 85 90 95
 Ser Val Pro Glu Ala Val Ile Leu Asp Ala Leu Ala Arg Val Gln Thr
 100 105 110
 Leu Phe Asp
 115

<210> 86
 <211> 111
 <212> PRT
 <213> Mycobacterium celatum

<400> 86
 Met Thr Glu Arg Gly Asp Ile Tyr Ile Val Ser Leu Asp Pro Thr Ser
 1 5 10 15
 Gly His Glu Gln Ser Gly Thr Arg Pro Val Leu Val Val Ser Pro Gly
 20 25 30
 Ala Phe Asn Arg Leu Thr Lys Thr Pro Val Val Leu Pro Ile Thr Arg
 35 40 45
 Gly Gly Asn Phe Ala Arg Thr Ala Gly Phe Ala Val Ser Leu Thr Asp
 50 55 60
 Ala Gly Thr Arg Thr Ala Gly Val Ile Arg Cys Asp Gln Pro Arg Ser
 65 70 75 80
 Ile Asp Ile Arg Ala Arg Lys Gly Arg Lys Val Glu Arg Val Pro Ser
 85 90 95
 Gly Val Leu Asp Glu Ala Leu Ala Lys Leu Ala Thr Ile Leu Thr
 100 105 110

<210> 87
 <211> 121
 <212> PRT
 <213> Shigella flexneri 2a str. 301

<400> 87
 Met Val Lys Ala Arg Thr Pro His Arg Gly Glu Ile Trp Tyr Phe Asn
 1 5 10 15
 Pro Asp Pro Val Ala Gly His Glu Leu Gln Gly Pro His Tyr Cys Ile
 20 25 30
 Val Val Thr Asp Lys Lys Leu Asn Asn Val Leu Lys Val Ala Met Cys
 35 40 45
 Cys Pro Ile Ser Thr Gly Ala Asn Ala Ala Arg Ser Thr Gly Val Thr
 50 55 60
 Val Asn Val Leu Pro Arg Asp Thr Gln Thr Gly Asn Leu His Gly Val
 65 70 75 80
 Val Leu Cys His Gln Leu Lys Ala Val Asp Leu Ile Ala Arg Gly Ala
 85 90 95
 Lys Phe His Thr Val Ala Asp Glu Lys Leu Ile Ser Glu Val Ile Ser
 100 105 110
 Lys Leu Val Asn Leu Ile Asp Pro Gln
 115 120

<210> 88
<211> 116
<212> PRT
<213> E. coli

<400> 88
Met Val Lys Lys Ser Glu Phe Glu Arg Gly Asp Ile Val Leu Val Gly
1 5 10 15
Phe Asp Pro Ala Ser Gly His Glu Gln Gln Gly Ala Gly Arg Pro Ala
20 25 30
Leu Val Leu Ser Val Gln Ala Phe Asn Gln Leu Gly Met Thr Leu Val
35 40 45
Ala Pro Ile Thr Gln Gly Gly Asn Phe Ala Arg Tyr Ala Gly Phe Ser
50 55 60
Val Pro Leu His Cys Glu Glu Gly Asp Val His Gly Val Val Leu Val
65 70 75 80
Asn Gln Val Arg Met Met Asp Leu His Ala Arg Leu Ala Lys Arg Ile
85 90 95
Gly Leu Ala Ala Asp Glu Val Val Glu Glu Ala Leu Leu Arg Leu Gln
100 105 110
Ala Val Val Glu
115

<210> 89
<211> 17
<212> RNA
<213> Artificial Sequence

<220>
<223> mRNA transcript

<400> 89
aatgatgaca ctggaag

17

<210> 90
<211> 17
<212> RNA
<213> Artificial Sequence

<220>
<223> mRNA transcript

<400> 90
gtcgttgaca ttgatgg

17

<210> 91
<211> 17
<212> RNA
<213> Artificial Sequence

<220>
<223> mRNA transcript

<400> 91
atctcgaaca cgcagcc

17

<210> 92
<211> 17
<212> RNA
<213> Artificial Sequence

<220>
<223> mRNA transcript

<400> 92
tcgttttaca cccttga

17